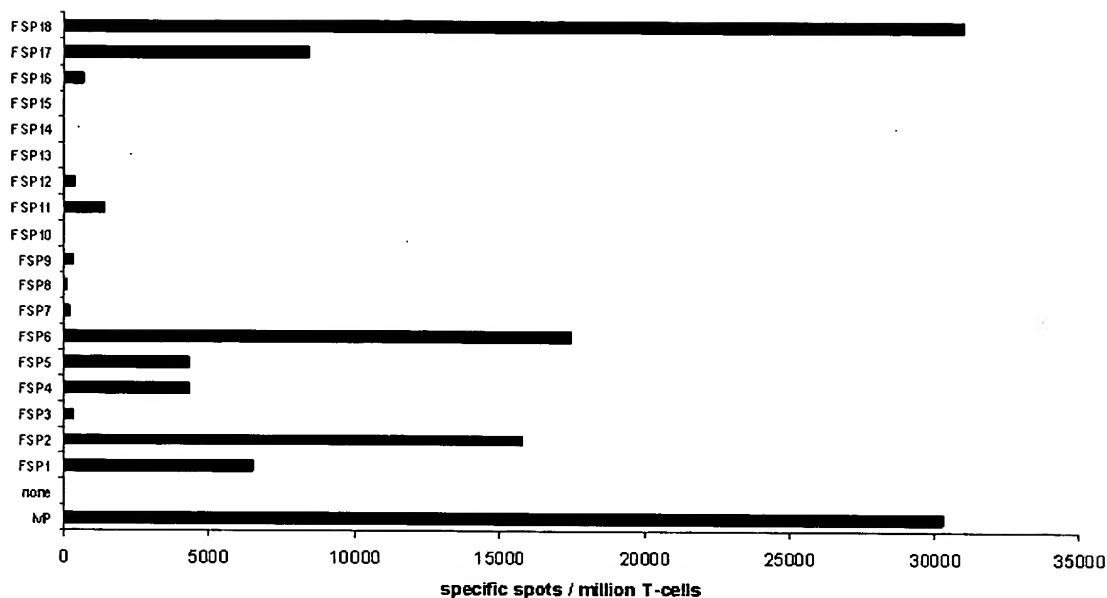
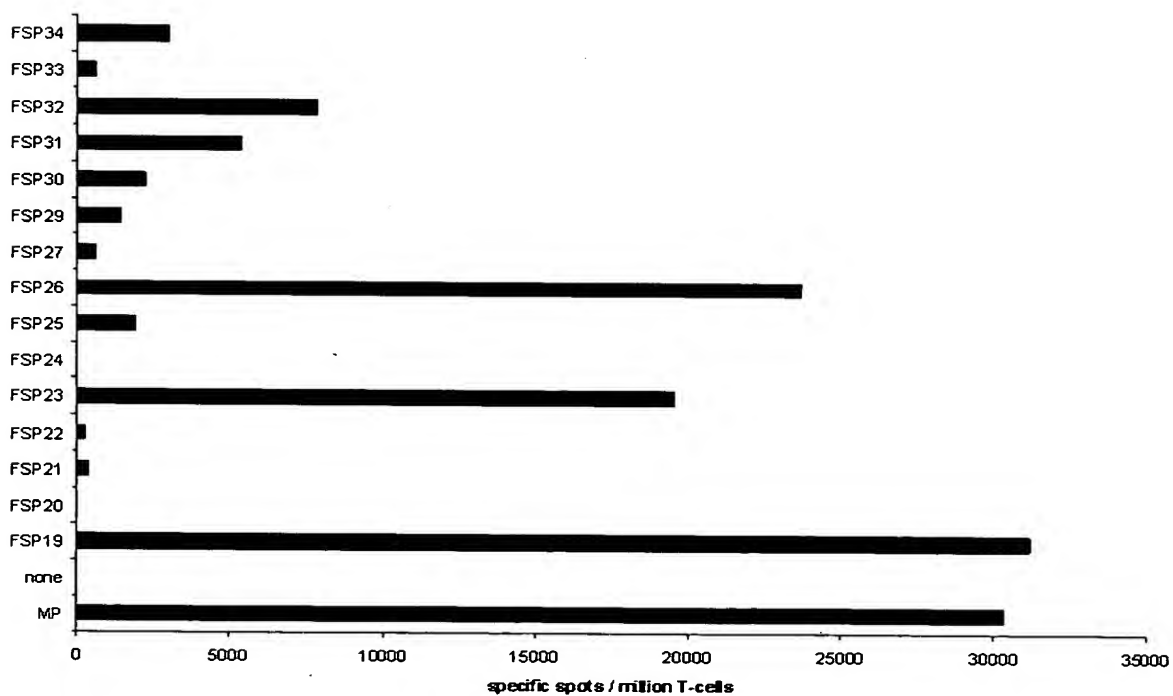


FIG.1

ELISpot analysis of FSP01 to FSP18



ELISpot analysis of FSP19 to FSP34



BEST AVAILABLE COPY

FIG. 2-1

HT001**wt ORF**

MQRPNNAHRISQPIRQIIYGLLLNASPHLDKTSWNALPPQPLAFSEVERINKNIRTSIIDAVELAKDHSLSRLTELSLRRRQMLLLETALKV
KQTILEPIPTSLKLPVAVSCYWLQHTETKAKLHHLQSLLLTMLVGPLIAIINSPGKEELQEDGAKMLYAEFQRVKAQTRLGTRLDLDTAHI
FCQWQSQCLQMGMYLNQLLSTPLPEPDLTRLYSGSLVHGLCQQLLASTSVESLLSICPEAKQLYEYLFNATRSYAPAEIFLPKGRSNSK
KKRQKKQNTSCSKNRGRRTAHTKCWYEGNNRFGLLMVENLEEHSSEASNE

(-1) ORF

MQRPNNAHRISQPIRQIIYGLLLNASPHLDKTSWNALPPQPLAFSEVERINKNIRTSIIDAVELAKDHSLSRLTELSLRRRQMLLLETALKV
KQTILEPIPTSLKLPVAVSCYWLQHTETKAKLHHLQSLLLTMLVGPLIAIINSPGKEELQEDGAKMLYAEFQRVKAQTRLGTRLDLDTAHI
FCQWQSQCLQMGMYLNQLLSTPLPEPDLTRLYSGSLVHGLCQQLLASTSVESLLSICPEAKQLYEYLFNATRSYAPAEIFLPKGRSNSK
KKGRNRNIPAVLRTEGEPLHTPSVGMRETTGLGC

(+1)/(-2) ORF

MQRPNNAHRISQPIRQIIYGLLLNASPHLDKTSWNALPPQPLAFSEVERINKNIRTSIIDAVELAKDHSLSRLTELSLRRRQMLLLETALKV
KQTILEPIPTSLKLPVAVSCYWLQHTETKAKLHHLQSLLLTMLVGPLIAIINSPGKEELQEDGAKMLYAEFQRVKAQTRLGTRLDLDTAHI
FCQWQSQCLQMGMYLNQLLSTPLPEPDLTRLYSGSLVHGLCQQLLASTSVESLLSICPEAKQLYEYLFNATRSYAPAEIFLPKGRSNSK
KK(K)AEETEYQLF

U79260**wt ORF**

MGHPRAIQPSVFFSPYDVHFLLYPIRCPYLKIGRFHIKLGHLFLFSFLFFFETQSHSVTRLECSGTISAHCNLCPLGSSNSPASASRV
AGTAGTCRRAQLIFVFLAEMGFHHVGRDGLDLNLVIHPPRSPKALGLQA

(-1)ORF

MGHPRAIQPSVFFSPYDVHFLLYPIRCPYLKIGRFHIKLGHLFLFSFLFFFLRHSLTLSPGWSAVARSRLTATSASQVQVILLPQPPEW
LGLQARAAAPS

(+1)/(-2)ORF

MGHPRAIQPSVFFSPYDVHFLLYPIRCPYLKIGRFHIKLGHLFLFSFLFFF(F)

PTHL3**(wt)ORF**

MQRRLVQQWSVAVFLLSYAVPSCGRSVEGLSRRLKRAVSEHQLLHDKGKSIQDLRRRFFLHHLIAEHTAEIRATSEVSPNSKPSNT
KNHPVRFQSDDEGRYLTQETNKVETYEQPLKTPGKKKKGKPGKRKEQEKKRRTRSAWLDSGVTGSGLEGDLSDTSTTSLELD
SRTALLWGLKKKKENNRTHHMLMISLFKSPLLL

(-1)ORF

MQRRLVQQWSVAVFLLSYAVPSCGRSVEGLSRRLKRAVSEHQLLHDKGKSIQDLRRRFFLHHLIAEHTAEIRATSEVSPNSKPSNT
KNHPVRFQSDDEGRYLTQETNKVETYEQPLKTPGKKKKGKPGKRKEQEKKRRTRSAWLDSGVTGSGLEGDLSDTSTTSLELD
SRTALLWGLKKKKRKTTEEHIICN

(+1)/(-2)ORF

MQRRLVQQWSVAVFLLSYAVPSCGRSVEGLSRRLKRAVSEHQLLHDKGKSIQDLRRRFFLHHLIAEHTAEIRATSEVSPNSKPSNT
KNHPVRFQSDDEGRYLTQETNKVETYEQPLKTPGKKKKGKPGKRKEQEKKRRTRSAWLDSGVTGSGLEGDLSDTSTTSLELD
SRTALLWGLKKK(K)GKQKNTSYATNDLII

TGFbRII**(wt)**

MGRGLLRGLWPLHIVLWTRIASTIPPHVQKSVNNDMIVTDNNGAVKFPQLCKFCDFRSTCDNQKSCMSNCSITSICEKPQEVCAV
WRKNDENITLETVCHDPKLPYHDFILEDAASPKCIMKEKKKPGETFFMCSSSDECNDNIIFSEEYNTSNPDLLLVIFQVTGISLLPPLG
VAISVIIIFCYRVNRQQLSSTWETGKTRKLMFSEHCAIILEDSDISSTCANNINHNTELLPIELDTLVGKGRFAEVYKAKLKONTS
EQFETVAVKIFPYEYASWKEKDIFSDINLKHENIQFLTAEERKTELKQYWLITAFHAKGNLQEYLTRHVISWEDLRKLGSLSLARGI
AHLHSDHTPCGRPKMPIVHRDLNSSLNVLKNDLTCCLCDGFLSLRLDPTLSVDDLANSQGVGTARYMAPEVLESRMNLENAESFKQT
DVYSMALVLWEMTSRCNAVGEVKDYEPFPGSKVREHPCVESMKDNVLRDRGRPEIPSWLHNHQIQMVCELTTECWDHDPPEARLT
AQCVAERFSELEHLDRLSGRSCSEKIPEDGSLNTTK

(-1)ORF

MGRGLLRGLWPLHIVLWTRIASTIPPHVQKSVNNDMIVTDNNGAVKFPQLCKFCDFRSTCDNQKSCMSNCSITSICEKPQEVCAV
WRKNDENITLETVCHDPKLPYHDFILEDAASPKCIMKEKKSLVRLSSCVPVALMSAMTTSSSQKNITPAILTCC

(+1)/(-2)ORF

MGRGLLRGLWPLHIVLWTRIASTIPPHVQKSVNNDMIVTDNNGAVKFPQLCKFCDFRSTCDNQKSCMSNCSITSICEKPQEVCAV
WRKNDENITLETVCHDPKLPYHDFILEDAASPKCIMKEKK(K)AW

MACS**(wt)ORF**

MGAQFSKTAAGKGEAAERPGEEAVASSPSKANGQENGHVKNVNGDASPAASGAKEELQANGSAPAADKEEPAAGSAAASPS
AEKGEPAAAAPEAGASVPEKEAPEAGEAAEPGSATAAEGEAASASSTSSPKAEDGATPSNETPKKKKKRFSFKKSFKLGGF
FKNNKEAGEGGEAEAPAAEGGKDEAAGGAAAAAAGEAASGEQAAAPGEEAAAGEGAAGGDPQEAQKQAAVAPEKPPASDE
TKAAEPEPSKVEEKAAEEAGASAAACEAPSAAGPGAPPEQEAAPAEPPAAAAASSACAAPSQEAQPECSPEAPPAEAAE

(-1)ORF

MGAQFSKTAAGKGEAAERPGEEAVASSPSKANGQENGHVKNVNGDASPAASGAKEELQANGSAPAADKEEPAAGSAAASPS
AEKGEPAAAAPEAGASVPEKEAPEAGEAAEPGSATAAEGEAASASSTSSPKAEDGATPSNETPKKKRSAPPSRLSS

(+1)/(-2)ORF

FIG. 2-2

MGAQFSKTAAGKGEAAERPGEEAAVASSPSKANGQENGHVKNVDASPAAESGAKEELQANGSAPAADKEEPAAGSGAASPSS
AEKGEPAAAAPEAGASPVKEAPAEGEAAEPGSATAAEGEAASASSTSSPKAEDGATPSPNETPKKK(K)EALFLQEVFQAERL
LLQEEQEGGWRRR

TCF-4

(wt)ORF

MPQLNGGGGDDLGADELISFKDEGEQEEKSSENSAERDLADVKSLLVNESETNQNSSDSEAERRPPRSESFDRKSRESLEE
AKRQDGGGLFKGPPYPGYPFIMIPDLTSPYLPNGSLSPARTYLQMKWPLLDVQAGSLQSRQALKDARSPSPAHIVSNKVPVQHPHH
VHPLTPLITYSNEHFTPGNPPPHLPADVDPKTGIPRPPHPPDISPYPLSPGTVGQIPHPLGWLVPQQGQPVYPITGGFRHPYPTALT
VNASVSFRPPHMPVPPHHTLHTTGIPHPAIVTPTVKQESSQSDVGSLSHSSKHQDSKKEEEKKKPHIKKPLNAFMYMKEMRAKVAEC
TLKESAAINQILGRRWHALSREEQAKYYELARKERQLHMQLYPGWSARDNYGKKKKRKRDKQPGETNEHSECFLNPCLSLPPITDLS
APKKCRARFGLDQQNNWCGPCRRKKCVRYIQGEGSCLSPSSDGSLLDSPPNLLGSPPRDAKSQTEQTQPLSLSLKPDPLAH
LSMMPPPPALLAEATHKASALCPNGALDLPALQPAAPSSSIAQSTSWLHSHSLAGTQPQLSLVTKSL

(-1)ORF

MPQLNGGGGDDLGADELISFKDEGEQEEKSSENSAERDLADVKSLLVNESETNQNSSDSEAERRPPRSESFDRKSRESLEE
AKRQDGGGLFKGPPYPGYPFIMIPDLTSPYLPNGSLSPARTYLQMKWPLLDVQAGSLQSRQALKDARSPSPAHIVSNKVPVQHPHH
VHPLTPLITYSNEHFTPGNPPPHLPADVDPKTGIPRPPHPPDISPYPLSPGTVGQIPHPLGWLVPQQGQPVYPITGGFRHPYPTALT
VNASVSFRPPHMPVPPHHTLHTTGIPHPAIVTPTVKQESSQSDVGSLSHSSKHQDSKKEEEKKKPHIKKPLNAFMYMKEMRAKVAEC
TLKESAAINQILGRRWHALSREEQAKYYELARKERQLHMQLYPGWSARDNYGKKKKRKRDKQPGETNEHSECFLNPCLSLPPITDLS
APKKCRARFGLDQQNNWCGPCRRKK(SAFATYKVKAAASAHPLQMEAY

(+) / (-2)ORF

MPQLNGGGGDDLGADELISFKDEGEQEEKSSENSAERDLADVKSLLVNESETNQNSSDSEAERRPPRSESFDRKSRESLEE
AKRQDGGGLFKGPPYPGYPFIMIPDLTSPYLPNGSLSPARTYLQMKWPLLDVQAGSLQSRQALKDARSPSPAHIVSNKVPVQHPHH
VHPLTPLITYSNEHFTPGNPPPHLPADVDPKTGIPRPPHPPDISPYPLSPGTVGQIPHPLGWLVPQQGQPVYPITGGFRHPYPTALT
VNASVSFRPPHMPVPPHHTLHTTGIPHPAIVTPTVKQESSQSDVGSLSHSSKHQDSKKEEEKKKPHIKKPLNAFMYMKEMRAKVAEC
TLKESAAINQILGRRWHALSREEQAKYYELARKERQLHMQLYPGWSARDNYGKKKKRKRDKQPGETNEHSECFLNPCLSLPPITDLS
APKKCRARFGLDQQNNWCGPCRRKK(K)VRS LHTR

TAF1b

(wt)ORF

IPAFPAAGTVLQPFPEAALATRVTPAVEAPAAPRLDLEEESEEFKERCTQCAAVSWGLTDEGKYCTSCHNVTERYQEVNTNDLIPNT
QIKALNRGLKKKNTEKGWDWVYCEGFQYILYQQAELKNLGVPELKNLNDVHNFWKRYLQKSKQAYCKNPVYTTGRKPTVLEDNL
SHSDWASEPELLSDVSCPFLFESGAESQSDIHRKPFPPVSKASQSETSVCSGLDGEYSQRKEKGIVKMTMPQTAFCYLSLLWQ
REAITLSDLLRFVEEDHIPYINAFQHFPEQMKLYGRDRGIFGIESWPDYEDYKKTIEVGTFLDLPRFPDITEDCYLHPNLCMKYLMV
LPDEMHSALTCHVVKMTGMGEVDFTFDPIAKMAKAVKYDVQAVIIVVVLKLLFLMDDSEFWLSNLAEKHNEKNKDKPWFDFRKY
YQIMKKADEKKQKWEERAKYLWKSEKPLYYSFVDKPVAYKKREMVNLQKQFSTLVDSTATAGKSPSSQFNWTEEDTDRTC
FHGHSLQGVLEKEGQSLLTKNSLYWLSTQKFCRW

(-1)ORF

IPAFPAAGTVLQPFPEAALATRVTPAVEAPAAPRLDLEEESEEFKERCTQCAAVSWGLTDEGKYCTSCHNVTERYQEVNTNDLIPNT
QIKALNRGLKKKTILKKAGIGMCVKVSSIFFINKQKP

(+) / (-2)ORF

IPAFPAAGTVLQPFPEAALATRVTPAVEAPAAPRLDLEEESEEFKERCTQCAAVSWGLTDEGKYCTSCHNVTERYQEVNTNDLIPNT
QIKALNRGLKKK(K)QY

AC-1

(wt)ORF

MDTQKQIHKTHNSKNQFFTIFFLSVEFGKEGTRKNFYLLSIGHYGRKSRRADLTADTADKTEPECFAASWTFDPNPSVTVSGAHS
TAVHQ

(-1)ORF

MDTQKQIHKTHNSKNQFFTIFFSCQLNLGRKEHAKIFTFFFQLDTMDGNPGELTLEQLTIQKQSQNALLPAGPLTQTPV

(+) / (-2)ORF

MDTQKQIHKTHNSKNQFFTIFF(F)PVS

Sec63

(wt)ORF

MAGQQFYDDSGNTFFYFLTSFVGLVIPATYYLWPRDQNAEQIRLNIRKVVYGRCMWYRLRLKQPNIPTVKKIVLAGWALFLFL
AYKVSCTDREYQEYNPYEVLNLDPGATVAEIKKQYRLLSLKYHPDKGGDEVFMFRIAKAYAALDEESRKNWEEFGNPDGPQATSF
GIALPAWIVDQKNSILVLLVYGLAFMVLVVGWSWYRSIRYSGDQILIRTTQIYTYFVYKTRNMDMKRLIMVLGASEFDPQYNKDAT
SRPTDNILIPQLIREIGSINLKKNEPPLTCPYSLKARVLLSHLARMKIPETLEEDQQFMLKKCPALLQEMVNVICQLIVMARNREERFR
APTLASLENCMKLSQMAVQGLQKFSPLLQLPHIEEDNLRVSNHKKYKIKTIQDLVSLKESDRHTLLHFLEDEKYEVMVAVLSFFPY
VTMDIKSQVLDDSDNNITVGSLLVTLVVKLTRQTMAEVFEKEQSICAAEEQPAEDGQGETNKNRTKGGWQQKSKGPKKTAKSKKK
PLKKKPTPVLLPQSKQKQKQANGVVGNEAAVKEDEEVSDKGSDEEEETNRDSQSEKDDGSDRSDREQDEKQNKDDEAEW
QELQSQIRKERALLETSKITHPVYSLYFPEEKQEWVWLYIADRKEQTLISMPYHVCTLKDTEEEVELKFPAPGKPGNYQYTVFLRSD
SYMGLDQIKPLKEVHEAKPVENHPQWDTAIEGDEDEQDESEGFEDSFEEDDDDD

(-1) 9er A-Repeat

MAGQQFYDDSGNTFFYFLTSFVGLVIPATYYLWPRDQNAEQIRLNIRKVVYGRCMWYRLRLKQPNIPTVKKIVLAGWALFLFL
AYKVSCTDREYQEYNPYEVLNLDPGATVAEIKKQYRLLSLKYHPDKGGDEVFMFRIAKAYAALDEESRKNWEEFGNPDGPQATSF
GIALPAWIVDQKNSILVLLVYGLAFMVLVVGWSWYRSIRYSGDQILIRTTQIYTYFVYKTRNMDMKRLIMVLGASEFDPQYNKDAT
SRPTDNILIPQLIREIGSINLKKNEPPLTCPYSLKARVLLSHLARMKIPETLEEDQQFMLKKCPALLQEMVNVICQLIVMARNREERFR
APTLASLENCMKLSQMAVQGLQKFSPLLQLPHIEEDNLRVSNHKKYKIKTIQDLVSLKESDRHTLLHFLEDEKYEVMVAVLSFFPY
VTMDIKSQVLDDSDNNITVGSLLVTLVVKLTRQTMAEVFEKEQSICAAEEQPAEDGQGETNKNRTKGGWQQKSKGPKKTAKSKKR
L

FIG. 2-3

(+1)/(-2) 9er A-Repeat

MAGQQFQYDDSGNTFFYFLTSFVGLIVIPATYYLWPRDQNAEQIRLKNIRKVVYGRMCWYRLRLKPQNIPTVKKIVLLAGWALFLFL
 AYKVSCTDREYQEYNPYEVLNLDPGATVAEIKKQYRLLSLKYHPDKGGDEVFMFRIAKAYAALDEESRKNWEEFGNPDGPQATSF
 GIALPAWIVDQKNSILVLLVYGLAFMVILPVVVGSWWYRSIRYSGDQILIRTTQIYTYFVYKTRNMDMKRLIMVLAGESEFDPQYNKDAT
 SRPTDNILIPQLIREIGSINLKKNEPPLTCPYSLKARVLLLSHLARMKIPETLEEDQQFMLKKCPALLQEMVNVICQLIVMARNREEREFR
 APTLASLENCMKLSQMAVQGLQQFKSPLLQLPHIEEDNLRVSNHKKYKIQTQDLVSLKESDRHTLLHFLEDEKEYEEMAVLGSFPY
 VTMDIKSQVLDDSDSNITVGS�VTVLVKLTRQTMAEVFEKEQSICAAEEQPAEDGQGETNKNRTKGGWQWQ
 KSKGPKTKAKSKK(K)ETFKKKTYTCAITTVKATETKAGKWSRWE

(-1) 10er A-Repeat

MAGQQFQYDDSGNTFFYFLTSFVGLIVIPATYYLWPRDQNAEQIRLKNIRKVVYGRMCWYRLRLKPQNIPTVKKIVLLAGWALFLFL
 AYKVSCTDREYQEYNPYEVLNLDPGATVAEIKKQYRLLSLKYHPDKGGDEVFMFRIAKAYAALDEESRKNWEEFGNPDGPQATSF
 GIALPAWIVDQKNSILVLLVYGLAFMVILPVVVGSWWYRSIRYSGDQILIRTTQIYTYFVYKTRNMDMKRLIMVLAGESEFDPQYNKDAT
 SRPTDNILIPQLIREIGSINLKKNEPPLTCPYSLKARVLLLSHLARMKIPETLEEDQQFMLKKCPALLQEMVNVICQLIVMARNREEREFR
 APTLASLENCMKLSQMAVQGLQQFKSPLLQLPHIEEDNLRVSNHKKYKIQTQDLVSLKESDRHTLLHFLEDEKEYEEMAVLGSFPY
 VTMDIKSQVLDDSDSNITVGS�VTVLVKLTRQTMAEVFEKEQSICAAEEQPAEDGQGETNKNRTKGGWQWQ
 KSKGPKTKAKSKKKPLKKNLHLCYYHSQSNRNKSRQMESLGMKLQ

(+1)/(-2) 10er A-Repeat

MAGQQFQYDDSGNTFFYFLTSFVGLIVIPATYYLWPRDQNAEQIRLKNIRKVVYGRMCWYRLRLKPQNIPTVKKIVLLAGWALFLFL
 AYKVSCTDREYQEYNPYEVLNLDPGATVAEIKKQYRLLSLKYHPDKGGDEVFMFRIAKAYAALDEESRKNWEEFGNPDGPQATSF
 GIALPAWIVDQKNSILVLLVYGLAFMVILPVVVGSWWYRSIRYSGDQILIRTTQIYTYFVYKTRNMDMKRLIMVLAGESEFDPQYNKDAT
 SRPTDNILIPQLIREIGSINLKKNEPPLTCPYSLKARVLLLSHLARMKIPETLEEDQQFMLKKCPALLQEMVNVICQLIVMARNREEREFR
 APTLASLENCMKLSQMAVQGLQQFKSPLLQLPHIEEDNLRVSNHKKYKIQTQDLVSLKESDRHTLLHFLEDEKEYEEMAVLGSFPY
 VTMDIKSQVLDDSDSNITVGS�VTVLVKLTRQTMAEVFEKEQSICAAEEQPAEDGQGETNKNRTKGGWQWQ
 KSKGPKTKAKSKKKPLKK(K)TYTCAITTVKATETKAGKWSRWE

Caspase 5**(wt)ORF**

MFKGILQSGLDNFVINHMLKNNVAGQTSIQTLVPNTDQKSTSVKKNHKKTKVKMLEYLGKDVHGVFNYLAKHDVLTLEEEKKKYY
 DAKIEDKALILVDSLKRNVAHQMFTQTLLNMDQKITSVKPLQIEAGPPESAESTNILKCPREEFLRLCKKNHDEIYPPIKKREDRRRLA
 LIICNTKFDHLPARNGAHYDIVGMKRLQGLGYTVVDEKNLTARDMESVLRFAARPEHKSSDSTFLVLMHSHGILEGICGTAHKKKKPD
 VLLYDTIFQIFNRRNCLSLDKPKVIVQACRGEKHGELWVRDSPASLAVISSQSENLEADSVCKIHEEKDFIAFCSSSTPHNVSWRDR
 TRGSIFITELITCFQKYSCCCHLMEIFRKVQKSFEVPOAKAQMPPTIERATLTRDFYLFPGN

(-1)ORF

MFKGILQSGLDNFVINHMLKNNVAGQTSIQTLVPNTDQKSTSVKKNHKKKQLRCWNTWAKMFFMVFLIWWQNTMF

(+1)/(-2)ORF

MFKGILQSGLDNFVINHMLKNNVAGQTSIQTLVPNTDQKSTSVKKNHKK(K)NS

AIM2**(wt)ORF**

MESKYKEILLTGLDNITDEELDRFKFFLSDEFNIATGKLHTANRIQVATLMIQNAGAVSAVMKTRIFQKLNMYMLAKRLQEEKEKVDKQ
 YKSVTKPKPLSQAEMSPAASAAIRNDVAKQRAAPKVSPHVKPEQKQMVAAQESIREGFQKRCLPVMVLKAKKPFTFETQEGKQEMF
 HATVATEKEFFVVKVFNLTLLKDKFIPKRRIIARYYRHSGFLEVNSASRVLDAESDQKVNPLNIIRKAGETPKINTLQTQPLGTIVNGLFV
 VQKVTEKKKNILFDLSDNTGKMEVLGVRNEDTMCKKEGDKVRLTFTLSKNGEKLQLTSGVHSTIKVIKAKKKT

(-1)ORF

MESKYKEILLTGLDNITDEELDRFKFFLSDEFNIATGKLHTANRIQVATLMIQNAGAVSAVMKTRIFQKLNMYMLAKRLQEEKEKVDKQ
 YKSVTKPKPLSQAEMSPAASAAIRNDVAKQRAAPKVSPHVKPEQKQMVAAQESIREGFQKRCLPVMVLKAKKPFTFETQEGKQEMF
 HATVATEKEFFVVKVFNLTLLKDKFIPKRRIIARYYRHSGFLEVNSASRVLDAESDQKVNPLNIIRKAGETPKINTLQTQPLGTIVNGLFV
 VQKVTEKKKNILFDLSDNTGKMEVLGVRNEDTMCKKEGDKVRLTFTLSKNGEKLQLTSGVHSTIKVIKAKKKHREVKRTNSSQLV

(+1)/(-2)ORF

MESKYKEILLTGLDNITDEELDRFKFFLSDEFNIATGKLHTANRIQVATLMIQNAGAVSAVMKTRIFQKLNMYMLAKRLQEEKEKVDKQ
 YKSVTKPKPLSQAEMSPAASAAIRNDVAKQRAAPKVSPHVKPEQKQMVAAQESIREGFQKRCLPVMVLKAKKPFTFETQEGKQEMF
 HATVATEKEFFVVKVFNLTLLKDKFIPKRRIIARYYRHSGFLEVNSASRVLDAESDQKVNPLNIIRKAGETPKINTLQTQPLGTIVNGLFV
 VQKVTEKKKNILFDLSDNTGKMEVLGVRNEDTMCKKEGDKVRLTFTLSKNGEKLQLTSGVHSTIKVIKAKK(K)NIEK

SLC23A1**(wt)ORF**

MMGIGKNTTSKSMAGSSTEGKYEDEAKHPAFFTLPPVINGGATSSGEQDNEDTELMAYTTENGIAEKSSLAETLDSTGSLDPQRS
 DMIYTIEDVPPWYLCIFLGLQHYLTCTSGTIAVPFLADAMCVGYDQWATSQIGTIFFCVGITTLLQTTFGCRLPLFQTSFAFLAPARA
 ILSLDKWKCNNTDVSANGTAELLHTEHIWYPRIREIQGAIMSSLIEVVIGLLGLPGALLKYIGPLTITPTVALIGLSGFGAAGERAGKHW
 GIAMLTIFLVLLFSQYARNVKFPLPIYKSKKGWTAAYKLQLFKMFPIILAILVSWLLCFIFTVDVFPDPSTKYGFYARTDARQGVLLVAPW
 FKVPYPFQWGLPTVSAAGVIGMLSAAVVASIESIGDYACARLSCAPPPPIHAINRGIFVEGLSCVLDGIFGTGNGSTSSSPNIGVLGITK
 VGSRRVIQCGAALMALGMIGKFSALFASLPDPVVGALFCTLFGMITAVGLSNLQFIDLNSSRNFLVGLGFSIFFGLVLPSTYLRQNPLVTGI
 TGIDQVLNVLTTAMFVGCCVAFILDNTIPGTEERGIKWKKGVGKGNKSLDGMEYNLPGFMNIIKKYRCFSYLPISPSTFVGYTWK
 GLRKSNDNSRSSDEDSQATG

(-1)ORF

MMGIGKNTTSKSMAGSSTEGKYEDEAKHPAFFTLPPVINGGATSSGEQDNEDTELMAYTTENGIAEKSSLAETLDSTGSLDPQRS
 DMIYTIEDVPPWYLCIFLGLQHYLTCTSGTIAVPFLADAMCVGYDQWATSQIGTIFFCVGITTLLQTTFGCRLPLFQTSFAFLAPARA
 ILSLDKWKCNNTDVSANGTAELLHTEHIWYPRIREIQGAIMSSLIEVVIGLLGLPGALLKYIGPLTITPTVALIGLSGFGAAGERAGKHW
 GIAMLTIFLVLLFSQYARNVKFPLPIYKSKKGWTAAYKLQLFKMFPIILAILVSWLLCFIFTVDVFPDPSTKYGFYARTDARQGVLLVAPW
 FKVPYPFQWGLPTVSAAGVIGMLSAAVVASIESIGDYACARLSCAPPPPSSTQ

(+1)/(-2)ORF

FIG. 2-4

MMGIGKNTTSKSMEAGSSTEGKYEDEAKHPAFFTLPVVINGGATSSGEQDNEDTELMAYTTENGIAEKSSLAETLDSTGSLDPQRS
 DMIYTIEDVPPWYLCIFLGLQHYLTFCSGTIAVPFLADAMCVGYDQWATSQILGTTIFFCVGITLLQTTFGCRLPLFQTSAAFLAPARA
 ILSLDKWKCNNTDVSANGTAELLHTEHIWYPRIREIQGAIMSSLIEVIGLLGLPGALLKYIGPLTITPTVALIGLSGFQAAGERAGKHW
 GIAMLTIFLVLLFSQYARNVKFPLPIYKSKKGWTAAYKLQLFKMFPIILVSWLLCFITVTVDFPPDSTKYGFYARTDARQGVLLVAPW
 FKVPYFPQWGLPTVSAAGVIGMLSAVVASIIIESIGDYYACARLSCAPP

(P)HPRNKQGNFRGRPLCS

ABC1

(wt)ORF

MPKAPKQPPPEWIGDGESTSPSDKVVKKGKDKKIKKTFFELAVEDKQAGEEEKVLKEKEQQQQQQQQQKKRDRTRKGRR
 KKDVEDDGEELMERLKKLSVPTSDEEDEVPAKPRGGKTKGGNVFAALIQDQSEEEEEEEKHPPKPAKPEKNRINKAVSEEQQ
 PALKGKKGKEEKSQKAKPQNKFAALDNEEDKEEEIIEKEPPKQGKEKAKKAEQMEYERQVASKAANAENDFSVQAEMSSR
 QAMLENASDIKLEKFSISAHGKELFVNADLYIVAGRRYGLVGPNGKGTLLKHIANRALSIPPNDVLLCEQEVVADETPAVQAVLRAD
 TKRLKLEEEERRLQGGLEQGGDTAERLEKVEELRATGAAAAEAKARRILAGLGFDPENQNRPTQKFSGGWRMRVSLARALFMEP
 TLLMLDEPTNHLDLNAVWLNLYLQGWRTLLIVSHDQGLDDVCTDIHLDAQRLHYRGNYMTFKMYQQKQKELLKQYEQKQKLL
 KELKAGGKSTKQAEKQTKALTRKQKQKRRKNQDEESQAEPELLKRPKEYTVRFTFPDPPPLSPPVLGLHGVTFGYQQGKPLFKNL
 DFGIDMDSRICVGPNGVGKSTLLLLTGKLTPTHGEMRKNHRLKIGFFNQYAEQLRMEETPTTEYLQRGFNLPYQDARKCLGRFGL
 SHAHTIQICKLSGGQKARVFAELACREPDVILDEPTNNLDIESIDALGEAINEYKGAIVVSHDARLITETNCQLWVVEEQSVSQIDG
 DFEDYKREVLEALGEVMVSRPRE

(-1)ORF

MPKAPKQPPPEWIGDGESTSPSDKVVKKGKDKKIKKTFFELAVEDKQAGEEEKVLKEKEQQQQQQQQQKKSEIPEKAGGR
RMWMMMEKRKSSWSVLRSSQCQPMRRMKYPPQNPAEGRKPRVVMFLQP

(+1)/(-2)ORF

MPKAPKQPPPEWIGDGESTSPSDKVVKKGKDKKIKKTFFELAVEDKQAGEEEKVLKEKEQQQQQQQQQKK(K)ARYPKRQA
EEGCG

HSPC259

(wt)ORF

SPDYFPQISSQFGTVEK
 MEKIFISSSTKAEGKISPFEPINTQAPPEKGKEAVVQEPERSWFQTEERKKEKIAKALQEFDLALRGKKRKKFMKDAKKKGEMT
 AEERSQFEILKAQMFAERLAKRNRRAKRARAMPEEEEPVRGPAKKQKQGGKSVFDEELTNTSKKALKQYRAGPSFEERKQLGLPHQR
 RGGNFKSNPDTRGGSSCRGLKKFMGAALKSLPCGKSSWLCLFSICLKKKQKQKTTLCGGMVRSYFPHVCQSPFLLISFHMTIL
 NGSIFGKRE

(-1)ORF

MEKIFISSSTKAEGKISPFEPINTQAPPEKGKEAVVQEPERSWFQTEERKKEKIAKALQEFDLALRGKKRKKFMKDAKKKGEMT
 AEERSQFEILKAQMFAERLAKRNRRAKRARAMPEEEEPVRGPAKKQKQGGKSVFDEELTNTSKKALKQYRAGPSFEERKQLGLPHQR
 RGGNFKSNPDTRGGSSCRGLKKFMGAALKSLPCGKSSWLCLFSICLKK(K)NKNKKQHFGVWVWYVAIFLSMSVNLPS

(+1)/(-2)ORF

MEKIFISSSTKAEGKISPFEPINTQAPPEKGKEAVVQEPERSWFQTEERKKEKIAKALQEFDLALRGKKRKKFMKDAKKKGEMT
 AEERSQFEILKAQMFAERLAKRNRRAKRARAMPEEEEPVRGPAKKQKQGGKSVFDEELTNTSKKALKQYRAGPSFEERKQLGLPHQR
 RGGNFKSNPDTRGGSSCRGLKKFMGAALKSLPCGKSSWLCLFSICLKK(K)TKTKNNTLVWVWYGT

Bax

(wt)ORF

MDGSGEQPRGGGPTSSEQIMKTGALLQGFIQDRAGRMGGEAPELALDPVPQDASTKKLSECLKRIGDELDSNMELQRMIAAVDT
 SPREVFRVAADMFSQDGNFNWGRVVALFYFASKLVKALCTKVPPELIRTIMGWTLDFLRERLLGWIQDQGGWDGLLSYFGTPTWQT
 VTFVAGVLTASLTWKKMG

(-1)ORF

MDGSGEQPRGGGPTSSEQIMKTGALLQGFIQDRAGRMGGRHPSWPWTRCLMRPPRS

(+1)/(-2)ORF

MDGSGEQPRGGGPTSSEQIMKTGALLQGFIQDRAGRMGG(G)GTRAGPGPGASGCVHQEAERVSQAHRGRTGQ

TCF6L1

(wt)ORF

MAFLRSMWGVLSALGRSGAELCTGCGSRLRSPFSFYVLPWFSSVLASCPKPKPVSSYLRFSEQLPIFKAQNPDAKTTELIRRIAQR
 WRELPSKKKIYQDAYRAEWQVYKEEISRFKEQLTPSQIMSLEKEIMDKHLKRKAMTKKKELTLGKPKRPRSAYNVYVAERFQAEK
 GDSPQEKLTQVKNWKNLSDSEKELYQHAKEDTRYHNEMKSWEEQMIEVGRKDLLRRTIKKQRKYGAEEC

(-1)ORF

MAFLRSMWGVLSALGRSGAELCTGCGSRLRSPFSFYVLPWFSSVLASCPKPKPVSSYLRFSEQLPIFKAQNPDAKTTELIRRIAQR
 WRELPSKKKIYQDAYRAEWQVYKEEISRFKEQLTPSQIMSLEKEIMDKHLKRKAMTKKKS

(+1)/(-2)ORF

MAFLRSMWGVLSALGRSGAELCTGCGSRLRSPFSFYVLPWFSSVLASCPKPKPVSSYLRFSEQLPIFKAQNPDAKTTELIRRIAQR
 WRELPSKKKIYQDAYRAEWQVYKEEISRFKEQLTPSQIMSLEKEIMDKHLKRKAMTKK(K)RVNTAWTKTKTSFSL

FTL3L

(wt)ORF

MTVLAPAWSPPTYLLLLLLSSGLSGTQDCSFQHSPISSDFAVKIRELSDYLLQDYPVTVASNLQDEELCGGLWRLVLAQRWMERLKT
 VAGSKMQGLLERVNTIEHFVTKCAFQPPPSCLRFVQTNISRLQETSEQLVALKPWITRONFSRCLELQCQPDSSSTLPPWSPRPLE
 ATAPTAPQPLLLLLLLPVGLLLAAWCLHWQRTTRRTPRPGEQVPPVPSQDLLLLVEH

(-1)ORF

MTVLAPAWSPPTYLLLLLLSSGLSGTQDCSFQHSPISSDFAVKIRELSDYLLQDYPVTVASNLQDEELCGGLWRLVLAQRWMERLKT
 VAGSKMQGLLERVNTIEHFVTKCAFQ
PPPAVFASSRPTSPASCRPPSSWWR

FIG. 2-5

(+1)/(-2)ORF

MTVLAPAWSPTTYLLLLLLSSGLSGTQDCSFQHSPISSDFAVKIRELSDYLLQDYPVTVASNLQDEELCGGLWRLVLAQRWMERLKT
VAGSKMQGLLERVNTIEHFVTKCAFQPP(P)QLSSLRPDQHLPPAGDLRAAGGAELDHSPPELLPVPGA AVSAR

OGT

(wt)ORF

MLQGHFWLVREGIMISPSSPPPNLFFFLQIFPFPFTSFPSHLLSLTPPKACYLKAIETQPNFAVAWSNLGCVFNAQGEIWLAIHFFE
KAVTLDPNFLDAYINLGNVLKEARIFDRAVAAYLRALSPPNHAVVHGNLACVYEEQGLIDLADTYRRAIELQPHFPDAYCNLANALKE
KGSVAEAEDCYNTALRLCPTHADSLNNLANIKREQGNIEEAVRLYRKALEVFPEFAAAHSNLASVLQQQGLQEAALMHYKEAIRISPTF
ADAYSNMGNLTKEMQDVQALQCYTRAIQINPAFADAHSNLASIHKDSGNIPEAIASRYRTALKLPDFDAYCNLAHCLQIVCDWTDY
DERMKKLVSIADQLEKNRLPSVHPHSMYPLSHGFRKAIAERHGNLCLDKINVHLKPPYEHKDLKLSDGRLRVGYVSSDFGNHPT
SHLMQSIQPMHNPDKFEVFCYALSPDDGTNFRVKVMAEANHFDLSQIPCNKGAADRIHQDGIHILVNMNGYTKGARNELFALRPAPI
QAMWLGYPGTSGALFMDYIITDQETSPAEEVAEQYSEKLA YMPHTFFIGDHANMFPHLKKKAVIDFKNNGHIYDNIRVLNGIDLKAFDLS
LPDVKIVKMKCPDGGDNADSSNTALNMPVIMNTIAEAVIEMINRGQIQITINGFSISNGLATTQINNKAATGEEVPRTIIVTTRSQYGLP
EDAIVYCNFNQLYKIDPSTLQMWANILKRPVNSVLWLLRFPVAVGEPNIQYQAQNMGLPQNRRIIFSPVAPKEEHVRRGQLADVCLDTPL
CNGHTTGMDVLWAGTPMVTMPGETLASRVAASQLTCLGCELIANKRQEYEDIAVKLGTDELYLKKVRGKVVWQRISSEPLFNTKQYT
MELERLYLQMWHEHYAAGNKPDHMIKPVEVTEA

(-1)ORF

MLQGHFWLVREGIMISPSSPPPNLFFSLYKFSFPLPPFPPIFFH

(+1)/(-2)ORF

MLQGHFWLVREGIMISPSSPPPNLFF(F)PFTNFPLSLYLLSLPSSFINPS

ELAVL3

(wt)ORF

MESQVGGGPAGRAPRPLLTNGATDDSKTNLVNYPQNMTQDEFKSLFGSIGDIESCKLVRDKITGQSLGYGFVNYSNDPNDADKA
INTLNGLLKLTQTKIKVSYARPSSASIRDANLYVSGLPKTMQSKEMEQLFSQYGRITSRLVDQVTGVSRGVGFIRFDKRIEAEAAIKGLN
GQKPLGAREPITVKFANNPSQKTGQALLTHLYQSSARRYAGPLHHQTQRFRDNLNLMAYAVKRFSPIADGMSGLAGVGLSGGAAG
GWCIFYVNLSPEDQSVLWQLFGPGAVTNKVIRDFTTNKCKGFGFMTMTNYDEAAMAIASLNGYRLGQRVLQVSFKTSKQHKHA

(-1)ORF

MESQVGGGARPAGLPNHSLVQMEPLTTARTSSSTTCPR

(+1)/(-2)ORF

MESQVGG(G)PGRPACPTATPWYKWSH

MAC30X

(wt)ORF

LFSHQRVQAQPTDYGGSFTRRCVEWLLGLYFLSHIPITLFDMLQAVVPRELYPVEFRNLLKWKYAKEFKDPLLQEPAPWFKSFLFCELV
FQLPFFPIATYAFKGSCKWIRTPAIISVHTMTTLILILSTFLFEDFSKASGFGKQRPETLHERLTLVSVYAPYLLIPFILLIFMLRSPYKY
EEKRKKK

(-1)ORF

LFSHQRVQAQPTDYGGSFTRRCVEWLLGLYFLSHIPITLFDMLQAVVPRELYPVEFRNLLKWKYAKEFKDPLLQEPAPWFKSFLFCELV
FQLPFFPIATYAFKGSCKWIRTPAIISVHTMTTLILILSTFLFEDFSKASGFGKQRPETLHERLTLVSVYAPYLLIPFILLIFMLRSPYKY
EEKRKKKNEGNHWPVEMPTGWLLVGYIQEHCEPTSSAAFTLAAMHKSKMVS GMTSNPHLLPFFFF

(+1)/(-2)ORF

LFSHQRVQAQPTDYGGSFTRRCVEWLLGLYFLSHIPITLFDMLQAVVPRELYPVEFRNLLKWKYAKEFKDPLLQEPAPWFKSFLFCELV
FQLPFFPIATYAFKGSCKWIRTPAIISVHTMTTLILILSTFLFEDFSKASGFGKQRPETLHERLTLVSVYAPYLLIPFILLIFMLRSPYKY
EEKRKK(K)MKETTTGPG

SLC4A3

(wt)ORF

MANGVI PPPGGASPLQVRVPLEEPPLSPDVEEEDDDLGLKTLAVSRFGDLISKPPAWDPEKPSRSYSERDFEFHRTSHHHPHLSA
RLPPPHKLRLRPPTSARHTRRKRRKKEKTSAPPSEGTPPIQEEGGAGVDEEEEEEEEEGESEAEPEPPPSGTPQKAKFSIGSDEDD
SPGLPGRAAVTKPLPSVGPHTDKSPQHSSSSPSPRARASRLAGEKSRWSPSASYDLRERLCPGSALGNPGGPEQQVPTDEAEAQ
MLGSADLDDMKSHRLEDNPGVRRHLVKKPSRTQGGGRGSPSGLAPILRRKKKKLDRRPHEVFVELNELMLDRSQEPHWRETARW
IKFEEDVEEETERWGWKPHVASLSFRSLELRRTIAHGAALLDLEQTTLPGLAHVVEVMIVSDQIRPEDRASVLRLLLLKHSHPNDDKDS
GFFPRNPSSSSMNSVLGNHPTPSHGPDPGAVPTMADDLGEPAWLPHDPDAKEKPLHMPGGDGHGRGSKLLEKIPEDAEATVVL
VGCVPFLEQPAFAFVRLNEAVLLESVLEVPVVRFLVMLGPSHTSTDYHELGRSIATLMSDKLFHEAAYQADDRQDLLSAISEFLDG
SIVIPPSEVEGRDLLRSVAAFQRELLRKRREEQTKVEMTTRGGYTAPGKELSLELGGSEATPEDDPLLRGTGVSFGLVRDVRRRYP
HYPDLRLDALHSQCVAALFIYFAALSPAIFGGLLGEKTEGLMGVSELIVSTAVLGVLSLLGAQPLLVGFGSGLLVFEEAFFKFCRA
QDLEYLTGRVWVGLWLVFVLAALVAAEGSLVRYISPFTQEIFAFLISLIFYETFYKLYKVFTHEPLLPFYPPGEGALEGSLAAGLEPNGS
ALPPTGPPSPRNQPNATLLSLMLGTFFIAFFLRKFRNSRFLGGKARRIIGDFGIPISILVMVLVDYSITDITYTQKLTVPTGLSVTSPDK
RSWFIPPLGSARPFPWMMVAAVALLVILIFMETQITALIVSQAARRLLKSGFHLDLLIGSLGGGLGFLGPWLTAATVRSVTHV
NALTVMTAIAPGDKPQIQEVREQRVTGVLIASLVGLSIVMGAVLRRIPAVLFGIFLYMGVTSLSGIQLSQRLLILMPAKHHPEQPYVT
KVKTWRMHFLTICQLGCIALLWVVKSTAASLAFPLLLLTVPRLRHCLLPRLFQDRELQALDSEDAEPNFDGQDEYNELHMPV

(-1)ORF

MANGVI PPPGGASPLQVRVPLEEPPLSPDVEEEDDDLGLKTLAVSRFGDLISKPPAWDPEKPSRSYSERDFEFHRTSHHHPHLSA
RLPPPHKLRLRPPTSARHTRRKRRKKEKTSAPPSEGTPPIQEEGGAGVDEEEEEEEEEGESEAEPEPPPSGTPQKAKFSIGSDEDD
SPGLPGRAAVTKPLPSVGPHTDKSPQHSSSSPSPRARASRLAGEKSRWSPSASYDLRERLCPGSALGNPGGPEQQVPTDEAEAQ
MLGSADLDDMKSHRLEDNPGVRRHLVKKPSRTQGGGRGSPSGLAPILRRKKKKLDRRPHEVFVELNELMLDRSQEPHWRETARW
IKFEEDVEEETERWGWKPHVASLSFRSLELRRTIAHGAALLDLEQTTLPGLAHVVEVMIVSDQIRPEDRASVLRLLLLKHSHPNDDKDS
GFFPRNPSSSSMNSVLGNHPTPSHGPDPGAVPTMADDLGEPAWLPHDPDAKEKPLHMPGGDGHGRGSKLLEKIPEDAEATVVL
VGCVPFLEQPAFAFVRLNEAVLLESVLEVPVVRFLVMLGPSHTSTDYHELGRSIATLMSDKLFHEAAYQADDRQDLLSAISEFLDG
SIVIPPSEVEGRDLLRSVAAFQRELLRKRREEQTKVEMTTRGGYTAPGKELSLELGGSEATPEDDPLLRGTGVSFGLVRDVRRRYP
HYPDLRLDALHSQCVAALFIYFAALSPAIFGGLLGEKTEGLMGVSELIVSTAVLGVLSLLGAQPLLVGFGSGLLVFEEAFFKFCRA
QDLEYLTGRVWVGLWLVFVLAALVAAEGSLVRYISPFTQEIFAFLISLIFYETFYKLYKVFTHEPLLPFYPPGEGALEGSLAAGLEPNGS
ALPPTGPPSPRNQPNATLLSLMLGTFFIAFFLRKFRNSRFLGGKARRIIGDFGIPISILVMVLVDYSITDITYTQKLTVPTGLSVTSPDK
RSWFIPPLGSARPFPWMMVAAVALLVILIFMETQITALIVSQAARRLLKSGFHLDLLIGSLGGGLGFLGPWLTAATVRSVTHV
NALTVMTAIAPGDKPQIQEVREQRVTGVLIASLVGLSIVMGAVLRRIPAVLFGIFLYMGVTSLSGIQLSQRLLILMPAKHHPEQPYVT
KVKTWRMHFLTICQLGCIALLWVVKSTAASLAFPLLLLTVPRLRHCLLPRLFQDRELQALDSEDAEPNFDGQDEYNELHMPV

(+1)/(-2)ORF

MANGVI PPPGGASPLQVRVPLEEPPLSPDVEEEDDDLGLKTLAVSRFGDLISKPPAWDPEKPSRSYSERDFEFHRTSHHHPHLSA
RLPPPHKLRLRPPTSARHTRRKRRKKEKTSAPPSEGTPPIQEEGGAGVDEEEEEEEEEGESEAEPEPPPSGTPQKAKFSIGSDEDD
SPGLPGRAAVTKPLPSVGPHTDKSPQHSSSSPSPRARASRLAGEKSRWSPSASYDLRERLCPGSALGNPGGPEQQVPTDEAEAQ
MLGSADLDDMKSHRLEDNPGVRRHLVKKPSRTQGGGRGSPSGLAPILRRKKKKLDRRPHEVFVELNELMLDRSQEPHWRETARW
IKFEEDVEEETERWGWKPHVASLSFRSLELRRTIAHGAALLDLEQTTLPGLAHVVEVMIVSDQIRPEDRASVLRLLLLKHSHPNDDKDS
GFFPRNPSSSSMNSVLGNHPTPSHGPDPGAVPTMADDLGEPAWLPHDPDAKEKPLHMPGGDGHGRGSKLLEKIPEDAEATVVL
VGCVPFLEQPAFAFVRLNEAVLLESVLEVPVVRFLVMLGPSHTSTDYHELGRSIATLMSDKLFHEAAYQADDRQDLLSAISEFLDG
SIVIPPSEVEGRDLLRSVAAFQRELLRKRREEQTKVEMTTRGGYTAPGKELSLELGGSEATPEDDPLLRGTGVSFGLVRDVRRRYP
HYPDLRLDALHSQCVAALFIYFAALSPAIFGGLLGEKTEGLMGVSELIVSTAVLGVLSLLGAQPLLVGFGSGLLVFEEAFFKFCRA
QDLEYLTGRVWVGLWLVFVLAALVAAEGSLVRYISPFTQEIFAFLISLIFYETFYKLYKVFTHEPLLPFYPPGEGALEGSLAAGLEPNGS
ALPPTGPPSPRNQPNATLLSLMLGTFFIAFFLRKFRNSRFLGGKARRIIGDFGIPISILVMVLVDYSITDITYTQKLTVPTGLSVTSPDK
RSWFIPPLGSARPFPWMMVAAVALLVILIFMETQITALIVSQAARRLLKSGFHLDLLIGSLGGGLGFLGPWLTAATVRSVTHV
NALTVMTAIAPGDKPQIQEVREQRVTGVLIASLVGLSIVMGAVLRRIPAVLFGIFLYMGVTSLSGIQLSQRLLILMPAKHHPEQPYVT
KVKTWRMHFLTICQLGCIALLWVVKSTAASLAFPLLLLTVPRLRHCLLPRLFQDRELQALDSEDAEPNFDGQDEYNELHMPV

FIG. 2-6

PRKDC**(wt)ORF**

MAGSGAGVRCSSLRLQETLSAADRCGAALAGHQLIRGLGQECVLSSSPAVLALQTSLVFSRDFGLLVFVRKSLNSIEFRECREEILKFL
CIFLEKMGQKIAPYSVEIKNTCTSVYTKDRAACKIPALDLLIKLLQTFRSSRLMDEFKIGELFSKFYGEALAKKKIPDVTLEKVYELLGGL
GEVHPSEMINNAENLFRALFELGELKTQMTSAVREPKLPLVLAGCLKGLSSLLCNFTKSMEEDPQTSREIFNFVLKAIRPQIDLKRYAVPSA
GLRLFALHASQFSTCLLDNYVSLFEVLLKWCATNVELKKAALSLESFLKQVSNMVAKNAEMHKNKLQYFMEQFYGIIRNVDSNNKE
LSIAIRGYGLFAGPCKVINAKVDVFMVELIQRCCKQMFLTQTDTGDDRVYQMPFSLQSVASVLLYLDTPVEVYTPVLEHLVVMQIDSF
QYSPKMLVCCRAIVKVFALAAGPVLRLNCISTVVHQGLIRICSKPVVLPKGPESESEDHRASGEVTRGKWKVPTYKYDVLFRHLL
SSDQMMDSILADEAFFSVNSSSESLNHLLYDEFVKSVLKIVEKDLTLEIQTVEGEQENGDEAPGVWMIPTSDPAANLHPAKPKDFSAFI
NLVEFCREILPEKQAEFFEPWVYSFSYELILQSTRPLISGFYKLLSITVRNAKKIKYFEGS

(-1)ORF

MAGSGAGVRCSSLRLQETLSAADRCGAALAGHQLIRGLGQECVLSSSPAVLALQTSLVFSRDFGLLVFVRKSLNSIEFRECREEILKFL
CIFLEKMGQKIAPYSVEIKNTCTSVYTKDRAACKIPALDLLIKLLQTFRSSRLMDEFKIGELFSKFYGEALAKKKYQ/QF

(+1)/(-2)ORF

MAGSGAGVRCSSLRLQETLSAADRCGAALAGHQLIRGLGQECVLSSSPAVLALQTSLVFSRDFGLLVFVRKSLNSIEFRECREEILKFL
CIFLEKMGQKIAPYSVEIKNTCTSVYTKDRAACKIPALDLLIKLLQTFRSSRLMDEFKIGELFSKFYGEALAKK(K)NTRYSFRRKS/

UVRAG**(wt)ORF**

MSASVGGPVPQPPPGPAAALPPGSAARALHVELPSQQRRLRHLRNIAARNIVNRNGHQLLDYFTLHLCSTEKIYKEFYRSEVIKN
SLNPTWRSDFGIMPDRLDTSVSCFVVKIWGGKENIYQLLIEWKVCLDGLKYLQQIHAHQNEIIFGLNDGYGAPFEHKGYSNAQK
TILLQVDQNCVRNSYDVFSLLRLHRAQCAIKQTQVTQKIGKIEIEKLRLTSTSNELKKKSECLQLKILVQNELEKQKALGREVALLH
KQQIALQDKGSFAEHLKLQKESNELRKECTAKRELFLKTNALQTLIRCRQLLSELSYIYPIDLNEHKDYFVCGVKLPNSDFQAK
DDGSI VALGYTAHLVSMISFFLQVPLRYPIIHKGSRSSTIKDNINDKLETEREFPLYPKGGEKLQFDYGVYLLKNIAQLRYQHGLGTP
DLRQTLPLNLKNFMEHGLMVRCDRHHTSSAIPVVKRQSSIFGGADVFGSGGIPSPDKGHRKRASSENERLQYKTPPPSYNSALAQPV
TVPSMGETERKITSLSLSDTSLDTSKSKENKKKGEDLVGSLNGGHANVHPSQEQQEALSGHRATVNGTLLPSEQAGSASVQLPGEFH
PVSEALCCTVEQAEIIGLEAQVSPQVIS

(-1)ORF

MSASVGGPVPQPPPGPAAALPPGSAARALHVELPSQQRRLRHLRNIAARNIVNRNGHQLLDYFTLHLCSTEKIYKEFYRSEVIKN
SLNPTWRSDFGIMPDRLDTSVSCFVVKIWGGKENIYQLLIEWKVCLDGLKYLQQIHAHQNEIIFGLNDGYGAPFEHKGYSNAQK
TILLQVDQNCVRNSYDVFSLLRLHRAQCAIKQTQVTQKIGKIEIEKLRLTSTSNELKKKVNAACS

(+1)/(-2)ORF

MSASVGGPVPQPPPGPAAALPPGSAARALHVELPSQQRRLRHLRNIAARNIVNRNGHQLLDYFTLHLCSTEKIYKEFYRSEVIKN
SLNPTWRSDFGIMPDRLDTSVSCFVVKIWGGKENIYQLLIEWKVCLDGLKYLQQIHAHQNEIIFGLNDGYGAPFEHKGYSNAQK
TILLQVDQNCVRNSYDVFSLLRLHRAQCAIKQTQVTQKIGKIEIEKLRLTSTSNELKKK(K)

MSH3**(wt)ORF**

MSRRKPASGGLAASSAPARQAVLSRFFQSTGSLKTSSTGAADQVDPGAAAAAAAAAAAAAPPAPPAPAFPPLPPHVATEIDRR
KKRPLENDGPVKKVKKVQKQEGGSDLGMSGNSEPKCLRTNRVSKSLEKLKEFCDSALPQSRVQTESLQERFAVLPKCTDFDDI
SLLHAKNAVSSSEDSKRQINQKDTTLFDLSQFGSSNTSHENLQKTASKSANKRSKSIYTPLELQYIEMKQKHDAVLCVECGYKYRFFG
EDAEIAARELNICHLDHNFMTASIPHRLFVHVRRLVAKGYKGVVVKQTETAALKAGIDNRSSLFSRKLALYTKSTLIGEDVNPLIKLD
DAVNVDEIMTDTSTSYLLCISENKENVRDKKKGNIFIGVGPATGEVVFDSFQDSASRSELETRMSSLQPVLELLPSALSEQTEALIH
RATSVSVQDDRRIVERMDNIYFEYSHAFQAVTEFYAKDTVDIKGSQIISGIVNLEKPVICSLAAIKYLKEFNLEKMLSKPENFKQLSSKM
EFMTINGTTLRNLEILQNQTDMMTKGSLVWLDHTKTSFGRRLKLVVTPQLLKLREINARLDVSEVLHSESSVFGQIENHLRKLPLDI
GRGLCSYIYHKKCTQEFFLIVKTLYHLKSEFQAIIPAVNSHIQSDLLRTVILEIPELLSPVEHYLKILNEQAQKVGDKTELFKDLSDFPKLIK
RKDEIQGVIDEIRMLHLEIRKILKNPSAQYVTVSGQEFMIEIKNSAVSCIPTDWVKVGSTKAVSRFHSFPFIVENYRHLNQLREQLVDCS
AEWLDLEKFESEHYHSLCKAVHHLATVDCIFSLAKVAKQGDYCRPTVQEERKIVIKNGRHPVIDVLLGEQDQYVPNNTDLSDESSEVM
IITGPNMGKSSYIKQVALITIMAQIGSYVPAEEATIGVDGIFTRMGADNIYKGRSTFMEELTDATIEIRKATSQSLVILDELGRGTSTH
DGAIAIYATLEYFIRDVKSLLTFVTHYPPVCELEKNYSHQVGNHMGFLVSEDESKLDPGTAEQVDFVTFLYQITRGIAARSYGLNVA
KLADVPGEILKKAHKSKEGLEINTKRRLKYFAKLWTHMNAQDLQKWTEEFNMEETQTSLLH

(-1)ORF

MSRRKPASGGLAASSAPARQAVLSRFFQSTGSLKTSSTGAADQVDPGAAAAAAAAAAAAAPPAPPAPAFPPLPPHVATEIDRR
KKRPLENDGPVKKVKKVQKQEGGSDLGMSGNSEPKCLRTNRVSKSLEKLKEFCDSALPQSRVQTESLQERFAVLPKCTDFDDI
SLLHAKNAVSSSEDSKRQINQKDTTLFDLSQFGSSNTSHENLQKTASKSANKRSKSIYTPLELQYIEMKQKHDAVLCVECGYKYRFFG
EDAEIAARELNICHLDHNFMTASIPHRLFVHVRRLVAKGYKGVVVKQTETAALKAGIDNRSSLFSRKLALYTKSTLIGEDVNPLIKLD
DAVNVDEIMTDTSTSYLLCISENKENVRDKK(RA)FLLALWECSLPQARCLIVSRTLLVQS

(+1)/(-2)ORF

MSRRKPASGGLAASSAPARQAVLSRFFQSTGSLKTSSTGAADQVDPGAAAAAAAAAAAAAPPAPPAPAFPPLPPHVATEIDRR
KKRPLENDGPVKKVKKVQKQEGGSDLGMSGNSEPKCLRTNRVSKSLEKLKEFCDSALPQSRVQTESLQERFAVLPKCTDFDDI
SLLHAKNAVSSSEDSKRQINQKDTTLFDLSQFGSSNTSHENLQKTASKSANKRSKSIYTPLELQYIEMKQKHDAVLCVECGYKYRFFG
EDAEIAARELNICHLDHNFMTASIPHRLFVHVRRLVAKGYKGVVVKQTETAALKAGIDNRSSLFSRKLALYTKSTLIGEDVNPLIKLD
DAVNVDEIMTDTSTSYLLCISENKENVRDKK(K)GQHFWYHCGSAACHRRGCV

ACVR2,**(wt) ORF**

MGAAAKLAF VFLISCSGA ILGRSETQEC LFFNANWEKD RTNQTGVEPC YGDKDKRRHC FATWKNISGS IEIVKQGCWL
DDINCYDRTD CVEKKDSPEV YFCCCEGNMC NEKFSYFPEM EVTQPTSNPV TPKPPYYNIL LYSVLPLMLI AGIVICAFWV

FIG. 2-7

YRHHKMAYPP VLVPTQDPGP PPPSPLLGLK PLQLLEVAKR GRFGCVWKAQ LLNEYVAVKI FPIQDKQSWQ NEYEVYSLPG
MKHENILQFI GAEKRGTSVD VDLWLITAFH EKGSLSDFLK ANVVSWNELC HIAETMARGL AYLEDIPGL KDGHKPAISH
RDIKSKNVLL KNNLTACIAD FGLALKFEAG KSAGDTHGQV GTRRYMAPEV LEGAINFORD AFLRIDMYAM GLVLWELASR
CTAADGPVDE YMLPFEEEEIG QHPSLEDMQE VVVHKKKRPV LRDYWQKHAG MAMLCETIEE CWDHDAEARL SAGCVGERIT
QMQLRLNIIT TEDIVTVVTM VTNVDFFPKE SSL*

A8, Pos. 451: -1 ORF (Mut.rate 16.3%)

MGAAAKLAFV VFLISCSSGA ILGRSETQEC LFFNANWEKD RTNQTGVEPC YGDKDKRRHC FATWKNISGS IEIVKQGCWL
DDINCYDRDT CVEKKALKY IFVAVRAICV MKSFLIFRRW KSHSPLQIQL HLSHPITTSC SIPWCHLC*

A8 Pos. 1476: -1 (Mut.rate 81.6%)

MGAAAKLAFV VFLISCSSGA ILGRSETQEC LFFNANWEKD RTNQTGVEPC YGDKDKRRHC FATWKNISGS IEIVKQGCWL
DDINCYDRDT CVEKKDSPEV YFCCCEGNMC NEKFSYFPEM EVTQPTSNPV TPKPPYYNIL LYSVLPLMLI AGIVICAFVW
YRHHKMAYPP VLVPTQDPGP PPPSPLLGLK PLQLLEVAKR GRFGCVWKAQ LLNEYVAVKI FPIQDKQSWQ NEYEVYSLPG
MKHENILQFI GAEKRGTSVD VDLWLITAFH EKGSLSDFLK ANVVSWNELC HIAETMARGL AYLEDIPGL KDGHKPAISH
RDIKSKNVLL KNNLTACIAD FGLALKFEAG KSAGDTHGQV GTRRYMAPEV LEGAINFORD AFLRIDMYAM GLVLWELASR
CTAADGPVDE YMLPFEEEEIG QHPSLEDMQE VVVHKKKGLF*

FLJ11053, A11 Pos. 1695, Mut.rate 52.2%

wt ORF

MVLRKLSKDD VTTKLKAMQE FGTMCETERDT ETVKGVLPYW PRIFCKISLD HRRRVREATQ QAFEKLTLLV KKQLAPYLKS
LMGYWLMAQC DTYTPAAFAA KDAFEAAFP SKQPEAIAFC KDEITSVLQD HLIKETPDTL SDPQTVPEEE REAKFYRVVT
CSLLALKRLL CLLPDNEIDS LEEKFKSLLS QNKFWKYGKH SVPQIRSAF ELVSALCQRI PQLMKEEASK VSPSVLLSID
DSDPIVCPAL WEAVLYTLTT IEDCWLHVNA KKSVPFKLST VIREGGRGLA TVIYPYLLPF ISKLPHSITN PKLDFFKNFL
TSLVAGLSTE RTKTSSSESS AVISAFYECL RFIMQQNLGE EEIEQMLVND QLIPFIDAVL KDPGLQHGQL FNHLAETLSS
WEAKADTEKD EKAHNLENV LIHFWERLSE ICVAKISEPE ADVESVLGVS NLLQVLQKPK SSLKSSKKKN GKVRFADEIL
ESNKENECV SSEGEKIEGW ELTTEPSLTH NSSGLLSPLR KPLEDLVCK LADISINYVN ERKSEQHLRF LSTLLDSFSS
SRVFKMLLGD EKQSIQAKP LEIAKLQKN PAVQFLYQKL IGWLNEDQRK DFGFLVDILY SALRCCNDM

-1 ORF

MVLRKLSKDD VTTKLKAMQE FGTMCETERDT ETVKGVLPYW PRIFCKISLD HRRRVREATQ QAFEKLTLLV KKQLAPYLKS
LMGYWLMAQC DTYTPAAFAA KDAFEAAFP SKQPEAIAFC KDEITSVLQD HLIKETPDTL SDPQTVPEEE REAKFYRVVT
CSLLALKRLL CLLPDNEIDS LEEKFKSLLS QNKFWKYGKH SVPQIRSAF ELVSALCQRI PQLMKEEASK VSPSVLLSID
DSDPIVCPAL WEAVLYTLTT IEDCWLHVNA KKSVPFKLST VIREGGRGLA TVIYPYLLPF ISKLPHSITN PKLDFFKNFL
TSLVAGLSTE RTKTSSSESS AVISAFYECL RFIMQQNLGE EEIEQMLVND QLIPFIDAVL KDPGLQHGQL FNHLAETLSS
WEAKADTEKD EKAHNLENV LIHFWERLSE ICVAKISEPE ADVESVLGVS NLLQVLQKPK SSLKSSKKKM VRLDLLMRYL
KAIKRMKNVY LQKERRLKAG N*

-2 ORF

MVLRKLSKDD VTTKLKAMQE FGTMCETERDT ETVKGVLPYW PRIFCKISLD HRRRVREATQ QAFEKLTLLV KKQLAPYLKS
LMGYWLMAQC DTYTPAAFAA KDAFEAAFP SKQPEAIAFC KDEITSVLQD HLIKETPDTL SDPQTVPEEE REAKFYRVVT
CSLLALKRLL CLLPDNEIDS LEEKFKSLLS QNKFWKYGKH SVPQIRSAF ELVSALCQRI PQLMKEEASK VSPSVLLSID
DSDPIVCPAL WEAVLYTLTT IEDCWLHVNA KKSVPFKLST VIREGGRGLA TVIYPYLLPF ISKLPHSITN PKLDFFKNFL
TSLVAGLSTE RTKTSSSESS AVISAFYECL RFIMQQNLGE EEIEQMLVND QLIPFIDAVL KDPGLQHGQL FNHLAETLSS
WEAKADTEKD EKAHNLENV LIHFWERLSE ICVAKISEPE ADVESVLGVS NLLQVLQKPK SSLKSSKKK W*

+1 ORF

MVLRKLSKDD VTTKLKAMQE FGTMCETERDT ETVKGVLPYW PRIFCKISLD HRRRVREATQ QAFEKLTLLV KKQLAPYLKS
LMGYWLMAQC DTYTPAAFAA KDAFEAAFP SKQPEAIAFC KDEITSVLQD HLIKETPDTL SDPQTVPEEE REAKFYRVVT
CSLLALKRLL CLLPDNEIDS LEEKFKSLLS QNKFWKYGKH SVPQIRSAF ELVSALCQRI PQLMKEEASK VSPSVLLSID
DSDPIVCPAL WEAVLYTLTT IEDCWLHVNA KKSVPFKLST VIREGGRGLA TVIYPYLLPF ISKLPHSITN PKLDFFKNFL
TSLVAGLSTE RTKTSSSESS AVISAFYECL RFIMQQNLGE EEIEQMLVND QLIPFIDAVL KDPGLQHGQL FNHLAETLSS
WEAKADTEKD EKAHNLENV LIHFWERLSE ICVAKISEPE ADVESVLGVS NLLQVLQKPK SSLKSSKKK W*

KIAA1052, A11 Pos. 689, Mut.rate 42.2%

wt ORF

MAGRPLRIGD QLVLEEDYDE TYIPSEQEIL EFAREIGIDP IKEPELMWLA REGIVAPLPG EWKPCQDITG DIYYFNFANG
QSMWDHPCDE HYRSLVIQER AKLSTSGAIK KKKKKKEKDD KKDRDPKSS LALGSSLAPV HVPLGGLAPL RGLVDTPPSA
LRGSQSVSLG SSVESGRQLG ELMPLSQGLK TSAYTKGLL SIYEDKTALS LLGLGEETNE EDEEESDNQS VHSSEPLRN
LHLDIGALGG DFEYEESLRT SQPEEKDVS LQSDAAGPPT PCKPSSPGAD SSLSSAVGKG RQSGARPGL PEKEENEKSE
PKICRNLVTP KADPTGSEPA KASEKEAPED TVDAGEEGSR REEAKEPKK KASALEEGSS DASQELEISE HMKEPQLSDS
IASDPKSFHG LDFGFRSRIE EHLLDQVLS PVLGGACRQA QQLGIEDKD DSQSSQDELQ QKSKGLEER YHRLSPPLPH
EERAQSPPRS LATEEPPQG PEGQPEWKEA EELGEDSAAS LSLQLSLQRE QAPSPPAACE KGKEQHSQAE ELGPGQEEAE
DPEEKVAVSP TPPVSPVRS TEPVAPPEQL SEAALKAMEE AVAQVLEQDQ RHLLSKQEK MQQLREKLCQ EEEEEILRLH
QQKEQSSSL RERLQKAIIE EEARMREES QRLSWLRAQV QSSTQADEQ IRAEQEASLQ KLREELESQ KAERASLEQK

FIG. 2-8

NRQMLEQLKE EIEASEKSEQ AALNAAKEKA LQQLREQLEG ERKEAVATLE KEHSAELERL CSSLEAKHRE VVSSLQKKIQ
 EAQQKEEAQL QKCLGQVEHR VHQKSYHVAG YEHELSSLLR EKRQEVEGEH ERRLDKMKEE HQQVMKARE QYEAERKQR
 AELLGHLTGE LERLQRAHER ELETVRQEQH KRLEDLRRRH REQERKLQDL ELDLETRAKD VKARLALLEV QEETARREKQ
 QLLDVQRQVA LKSEEATATH QQLEEAQKEH THLLQSNQQL REILDELQAR KKLKESQVDL LQAQSQQLQK HFSSLEAEAQ
 KKQHLLREVT VEENNASPHF EPDLHIEDLR KSLGTNQTKE VSSSLSQSKE DLYLDSLSSH NVWHLLSAEG VALRSAKEFL
 VQQTRSMRRR QTALKAAQGH WRHELASAE VAKDPPGIKA LEDMRKNLEK ETRHDEMKS AMRKGHNLLK KKEEKLNLQLE
 SSLWEEASDE GTLGGSPKK AVTFDLSMD SLSESSESF SPPHLDSTPS LTRKIHGLS HSLRQISSQL SSVLSILDSL
 NPQSPPLLA SMPAQLPPRD PKSTPTPTYY GSLARFSALS SATPTSTQWA WDSGQGPRLP SSVAQTVDDF LLEKWRKYFP
 SGIPLLSNP TPLESRLGYM SASEQLRLQ HSHSQVPEAG STTFQGIIEA NRRWLERVKN DPRLPLFSST PKPKATLSLL
 QLGLDEHNRV KVYRF*

- 1 ORF

MAGRPLRIGD QLVLEEDYDE TYIPSEQEIL EFAREIGIDP IKEPELMWLA REGIVAPLPG EWKPCQDITG DIYYNFANG
 QSMWDHPCDE HYRSLVIQER AKLSTSGAIK KKKKKRKRKT RRTEPPKVR WPWVPH*

- 2ORF

MAGRPLRIGD QLVLEEDYDE TYIPSEQEIL EFAREIGIDP IKEPELMWLA REGIVAPLPG EWKPCQDITG DIYYNFANG
 QSMWDHPCDE HYRSLVIQER AKLSTSGAIK KKKKKGKERQ EGQRPPQKFA GLGFLISPSS CSSWGPCSFT RSCGYPTLCS
SWISKREPG LSGVWTSARW THAAFTGSQD LCLYKGSGLHI*

+ 1 ORF

MAGRPLRIGD QLVLEEDYDE TYIPSEQEIL EFAREIGIDP IKEPELMWLA REGIVAPLPG EWKPCQDITG DIYYNFANG
 QSMWDHPCDE HYRSLVIQER AKLSTSGAIK KKKKKGKER QEGQRPPQKF AGLGFLISPS SCSSWGPCSF TRSCGYPTLC
SSWISKREPG ELSGVWTSARW RTHAAFTGSQ DLCLYKGSGLHI*

FIG. 3
FSP02

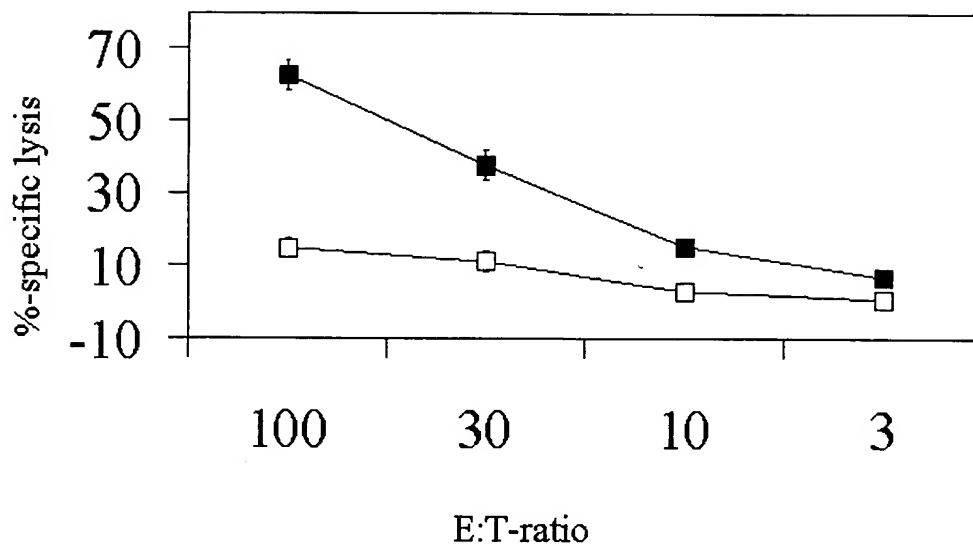
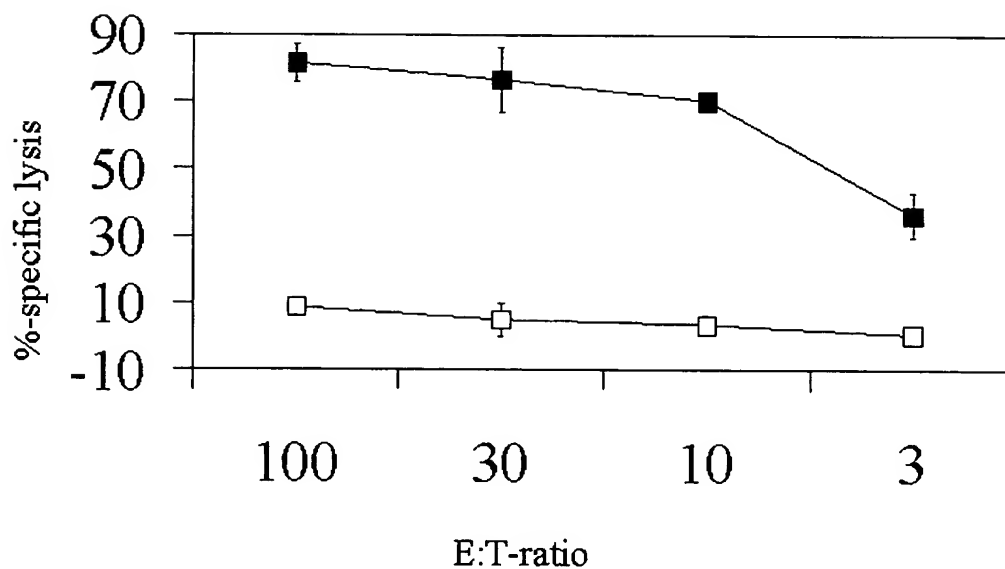


Figure 4

FSP06



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